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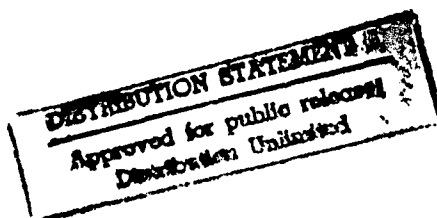
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## An Investigation of Marriage and Dependency Rates for Enlisted Marines

Adebayo Adedeji

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# **An Investigation of Marriage and Dependency Rates for Enlisted Marines**

Adebayo Adedeji

*Operations and Support Division*



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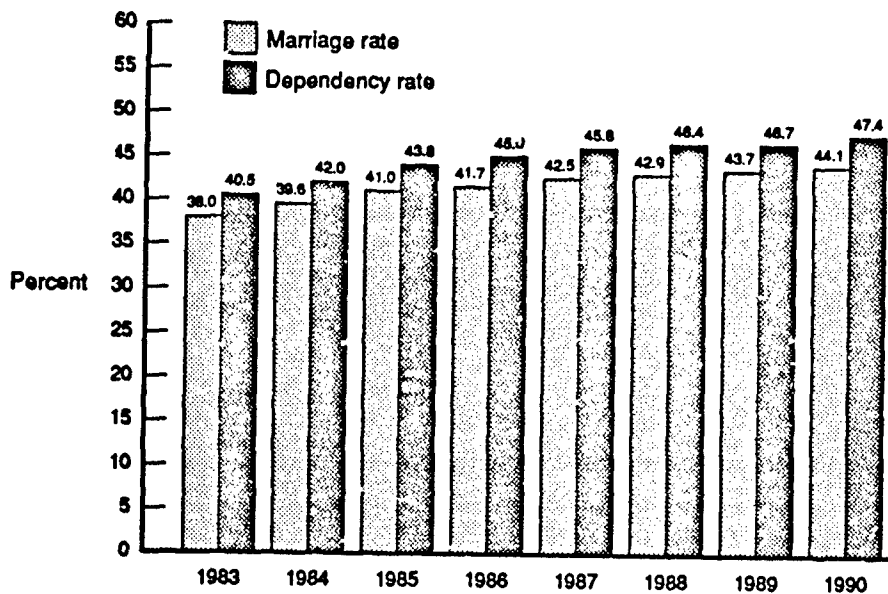
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#### ABSTRACT

This research memorandum analyzes the factors underlying the recent growth in the proportion of enlisted Marines that are married or that have dependents. A methodology is applied to partition the increase in marriage and dependency rates into the part that is due to changes in the characteristics of enlisted Marines, particularly an increase in the average age, and the part that is unexplained by changes in characteristics.

## EXECUTIVE SUMMARY

The proportion of enlisted Marines who are married or who have dependents has been rising in recent years. This research memorandum focuses primarily on the changes since FY 1983 (see figure I). While 38.0 percent of enlisted male Marines were married in September 1983, by September 1990 this percentage had grown to 44.1. Also, the percentage of male Marines with dependents (including spouse) increased from 40.5 to 47.4 percent in the same period. There was a similar trend for female enlisted Marines. Most of the increase in marriage and dependency rates among enlisted Marines is driven by higher rates for grades E-3 through E-5 (primarily Marines in their twenties).



NOTE: Dependents include spouse and children under 18 years of age.

Figure I. Marriage and dependency rates for enlisted male Marines, September of year



This research memorandum analyzes the factors underlying the recent growth in the proportion of enlisted Marines who are married or who have dependents. A shift-share analysis technique<sup>1</sup> is employed to break down the changes in marriage and dependency rates<sup>1</sup> into the part that is due to changes in the mix of characteristics<sup>2</sup> and the part that is due to changes in behavior.

The results show that the current trend cannot be explained by changes in the mix of characteristics (mostly an older force) alone; there are behavioral factors involved as well. Figures II and III show that at least about half of the changes in marriage and dependency rates of enlisted males since September 1983 can be attributed to changes in behavior. This is another way of saying that there were significant increases in the likelihood of marriage within specific age groups. There was a similar finding for enlisted female Marines.

Unlike civilian males of comparable age groups, enlisted Marines were more likely to be married at the end than at the beginning of the 1980s. Figure IV illustrates marriage rates of 20- to 29-year-old male enlisted Marines and civilians since 1983.<sup>3</sup> The falling marriage rate among civilians between 20 and 29 years old in figure IV is actually a reflection of a decline in marriage rates in the general population since the late 1950s.<sup>4</sup>

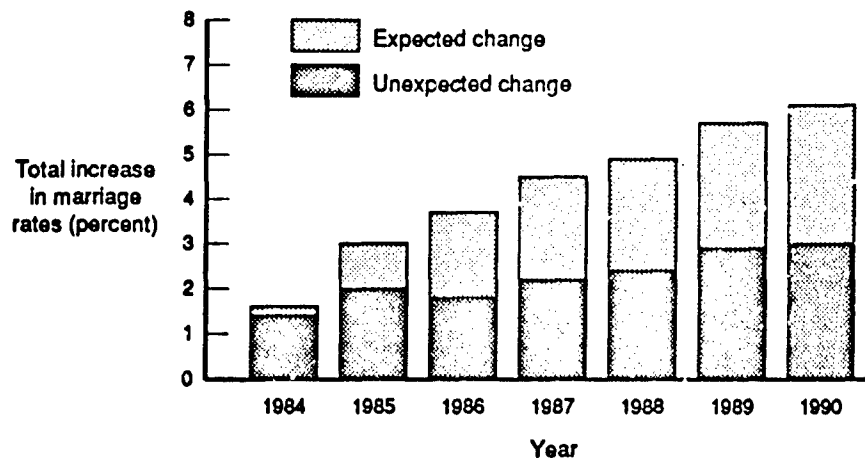
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1. The enlisted marriage rate is the proportion of enlisted Marines who are married. Similarly, the dependency rate is the proportion who have one or more dependents, including spouse.

2. The mix of characteristics focused on are racial/ethnic background, age, and grade, because marriage/dependency rates are known to vary by these characteristics. For example, older or higher ranking enlisted Marines are more likely to be married or have children than younger or lower ranking enlisted Marines.

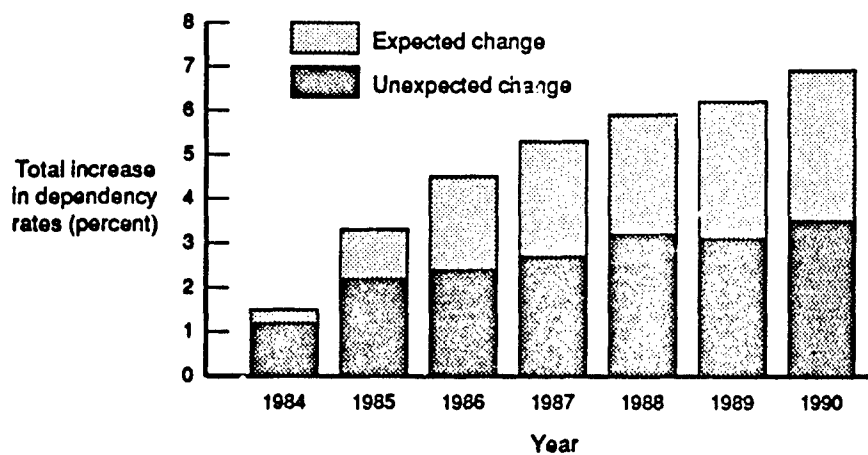
3. Marines who are between 20 and 29 years old constitute about two-thirds of the entire enlisted force. Moreover, higher marriage rates of Marines in this age group are a major source of the overall increases in marriage rates among all enlisted Marines. Data for the age group shown were unavailable before 1983.

4. The marriage rate, measured in number of marriages per 100 unmarried women, has been declining since the late 1950s. By 1987, it reached 5.6 marriages per 100 unmarried women, matching the all-time low rate of the economic depression of the 1930s. For further details, see James R. Wetzel's "American Families: 75 Years of Change," in *Monthly Labor Review*, March 1990, pp. 4-13.



NOTES: Expected change = portion accounted for by changes in the mix of characteristics.  
Unexpected change = portion accounted for by shifts in behavior.

Figure II. Composition of total increase in marriage rates over 1983, males



NOTES: Expected change = portion accounted for by changes in the mix of characteristics.  
Unexpected change = portion accounted for by shifts in behavior.

Figure III. Composition of total increase in dependency rates over 1983, males

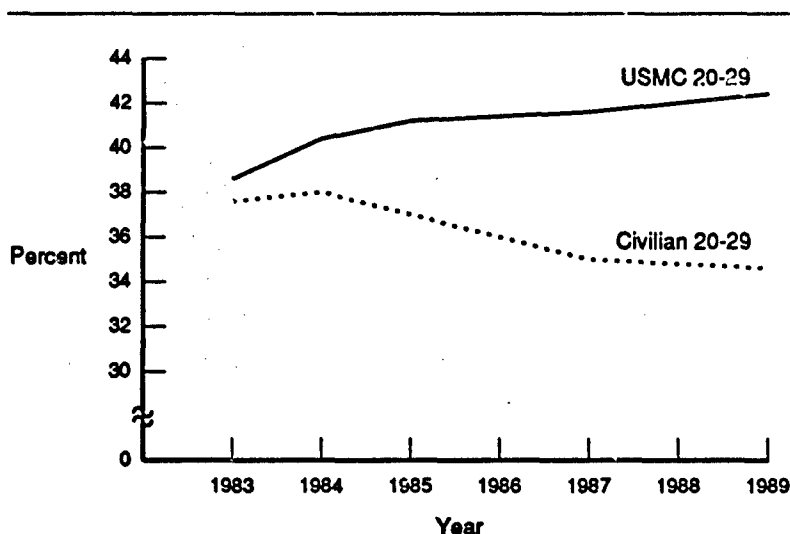


Figure IV. Percentage married, by age group: enlisted male Marines and civilians, 1983-1989

A working hypothesis is that the military pay raises of 1981 and 1982 are associated with the rise in marriage and dependency rates among enlisted Marines in two ways. First, higher military pay meant higher retention of recommended and eligible Marines with the result that the enlisted force has become slightly more senior in age and in grade. Indeed, the age shift is identified in this research memorandum as one source of the increase in marriage and dependency rates among Marines. Second, higher pay meant that more Marines (on average) could afford a family, which may explain the increase in marriage rates within specific age groups in the Marine Corps. This effect would be more true for the early years after the pay raises (namely 1983) than for the later years. Support for the positive effect of military pay on marriage and dependency rates of enlisted Marines can be found in previous CNA research.<sup>1</sup>

1. See CNA Research Memorandum 85-25, *Determinants of Dependency Rates for Marine Corps Enlisted Personnel*, May 1985, and CNA Research Memorandum 86-198, *An Analysis of Marine Corps Enlisted Dependency Rates*, September 1986, both by Peter F. Kostuk.

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## INTRODUCTION

The recent past has witnessed substantial changes in the characteristics of enlisted personnel in the Marine Corps. One such change is the significant (and apparently sustained) increases in marriage and dependency rates.<sup>1</sup> One of the issues being addressed by an ongoing Marine Corps retention study is the effect of different marriage and dependency statuses on retention. A thorough analysis of current levels as well as trends in marriage and dependency rates is a necessary background for that study.

Family formation has a substantial impact on the costs of force management. Some of the costs that are directly affected are the costs of housing (on-base maintenance and construction and basic allowances for quarters for off-base residents); moving; family programs, such as base child care and youth centers; health care; and education. Thus, understanding family formation is essential for planning for future budget requirements, not to mention the effects it may have on retention and readiness.

The current Persian Gulf crisis has forced many to revisit the issue of military family needs in times of hostilities. Never before have so many men and women of the Armed Forces been deployed overseas at wartime with spouses and children left behind. In some cases, husbands and wives were deployed together, leaving children without their parents nearby. In other cases, single parents were deployed, leaving their children with relatives or friends. This aspect of the human effects of Operation Desert Shield (and Desert Storm) lends relevance and timeliness to a study of Marine Corps family status, the debate about the place of families in the military aside.

This research memorandum (RM) analyzes the factors underlying the recent growth in marriage and dependency rates in the Marine Corps. (The analysis is done separately for men and women; the results for women are presented in appendix A.) While analysis of the costs of married versus unmarried Marines in the broader context of allowances and the provision of family services is beyond the scope of this effort, identifying the factors associated with the changes in family formation should provide important inputs for future research.

## PAST RESEARCH

Earlier research on the issue used regression techniques (on data up to FY 1985) to identify factors associated with marriage and dependency rates [1, 2]. Age was found to be an important factor associated with higher marriage and dependency rates: The enlisted

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1. The enlisted marriage rate is the proportion of enlisted Marines who are married. Similarly, the dependency rate is the proportion who have one or more dependents, including spouse.

force was getting older, on average, and older Marines are more likely to be married or have dependents. It was also found that the then-observed shifting of the enlisted force toward higher grades had a similar positive effect on marriage and dependency rates.<sup>1</sup>

Other findings were that military pay and chronological time (not time in service) were associated with marriage and dependency rates. Such findings on military pay and a time trend are of particular importance, because they show that there are influences independent of age and grade shifts.<sup>2</sup> Military pay is positively related to marriage and dependency rates, because higher income makes starting a family more affordable. The time trend captures an autonomous increase in marriage and dependency rates independent of age and pay changes.

Quarterly dependency rates for each grade were projected from FY 1986 to FY 1989 with reasonable accuracy. However, the framework within which the projections were made assumes that the rate of increase in dependency rates would continue indefinitely, although it might be reasonable to accept the possibility of dependency rates leveling off at some point. This potential for error is a result of a simple extrapolation of historical behavior into the future. Nevertheless, such an approach may still yield useful insights so long as the projections do not go too far into the future.

Rather than impose a structure or a model on the data, the approach taken here is to break down changes in marriage and dependency rates into expected and unexpected changes.<sup>3</sup> The expected change is similar to the part of the total differential in marriage and dependency rates that is due to changes in the mix of characteristics of the population being examined. The unexpected change is similar to the part that is

---

1. Reference [1] reported that the proportion of the enlisted force that were in grades E-1/E-2, E-3/E-5, and E-6/E-9 changed from 29.1, 55.6, and 15.3 percent in 1980 to 21.0, 62.2, and 16.8 percent in 1985, respectively. These numbers were updated to 1990; Marines in grades E-1/E-2, E-2/E-5, and E-6/E-9 now account for 18.7, 64.3, and 17.1 percent of the enlisted force, respectively. There are now smaller percentages of enlisted Marines in the lower grades, with correspondingly higher proportions in the higher grades.

2. This is an issue that must be addressed, since historical data showed that marriage and dependency rates were rising even within age groupings and within specific grades.

3. This approach allows the data to follow any functional form (or structure) because the breakdown is achieved (as will be seen later) by using rates of groups of recruits (grouped data) as opposed to using regression equations.

due to other factors (behavior). Such an approach can provide further knowledge of changes in marriage and dependency rates and may contribute to greater understanding of its effects on force readiness and retention.<sup>1</sup>

#### DATA

The data used were obtained from Headquarters Master File (HMF) tapes from September 1983 to September 1990. The analysis will therefore focus on changes in marriage and dependency rates from the two endpoints of 1983 and 1990 as well as on changes from year to year. FY 1983 was chosen as the base year because the earliest data available to CNA that include all of the background characteristics of each Marine were contained in the FY 1983 HMF tapes.

In order to establish dependency status, all ten dependents relationship (DEPREL) fields in the HMF tapes were scanned. The DEPREL fields list all legal dependents (including spouse). From these fields, a variable, NUMDEP\_C, that counts the number of dependents reported by each Marine was established.<sup>2</sup>

The dependency rate is then calculated as the proportion of enlisted Marines that reported one or more dependents including the spouse. Similarly, the marriage rate (utilizing the marital status or MAR-STAT field) is calculated as the proportion who are married. A caveat about the marriage rates: the denominator includes individuals who are separated, widowed, or divorced. These individuals were categorized as "other" from the MAR-STAT field. Thus, the marriage rate, as it is measured herein, is the proportion of enlisted Marines who are currently married.

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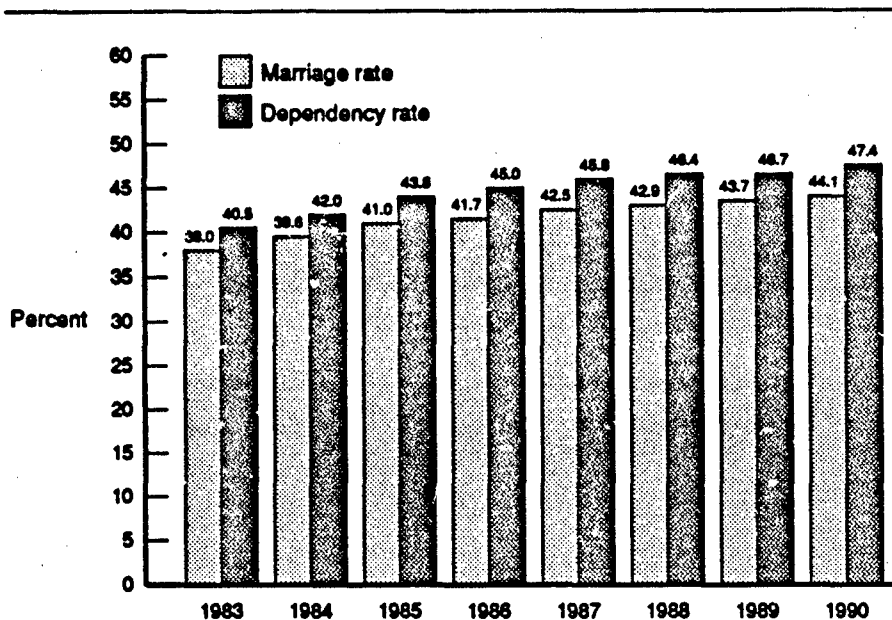
1. Further knowledge is achieved because the approach attributes relative importance to the different factors that contribute to changes in marriage and dependency rates.

2. There is another dependency field, NUMDEP, in the HMF tapes that is the expected number of dependents anticipated to move in the Marine's next permanent change of station (PCS) move. It was decided not to use this field because not all dependents are necessarily included in it.



## RECENT TRENDS

Evidence reveals that marriage and dependency rates for enlisted personnel in the Marine Corps have been rising in the last several years. For example, figure 1 shows that marriage and dependency rates for male Marines have risen from 38.0 and 40.5 percent in FY 1983 to 44.1 and 47.4 percent in FY 1990, respectively. The marriage rate for enlisted female Marines rose from 38.2 percent in FY 1983 to 42.5 percent in FY 1990; the dependency rate of enlisted female Marines increased from 32.7 percent in FY 1983 to 43.4 percent in FY 1990. (The yearly rates for females are presented in appendix A.)<sup>1</sup>



NOTE: Dependents include spouse and children under 18 years of age.

Figure 1. Marriage and dependency rates for enlisted male Marines, September of year

1. Note that marriage rates for females are higher than their dependency rates. Ordinarily this should not be so, since dependency rates include dependent spouses. One of the reasons marriage rates are higher than dependency rates for females could be that females who have military spouses generally do not claim their husbands as dependents. Two out of three married female Marines have military spouses. Therefore, an analysis of dependency rates for enlisted female Marines does not present a full picture and is presented in appendix A for this reason.

From the standpoint of personnel costs, it should be noticed from table 1 that there are now over 16,000 more children (pre-school-age, under 6, and school age, from 6 to 17 years, of both male and female Marines) than there were in FY 1983, a growth of 21 percent. Although the total number of children in FY 1988 and FY 1989 fell from what it was in FY 1987, the drop was mainly due to lower end-strength; the number of children per enlisted Marine (male or female) continued to increase.<sup>1</sup>

**Table 1. Dependent children under 18 of enlisted male and female Marines**

	1983	1984	1985	1986	1987	1988	1989	1990
Number (thousands) of:								
Pre-school-age children	42.2	46.3	49.0	49.6	50.8	49.2	48.9	49.9
School-age children	38.9	40.6	42.6	44.2	45.5	45.9	46.4	48.1
Total children under 18 years	81.1	86.9	91.6	93.8	96.3	95.1	95.3	98.0
Number (thousands) of:								
Currently married Marines	66.4	70.0	73.4	74.8	76.6	76.3	77.4	78.2
Currently married Marines with children	38.7	42.1	44.7	45.7	47.2	47.5	48.0	48.9
Not currently married Marines	108.2	106.4	105.0	104.3	103.3	101.5	100.4	99.3
Single	103.3	101.6	99.8	99.0	98.5	96.6	95.0	93.7
Other	4.8	4.8	5.2	5.3	4.8	4.9	5.3	5.7
Not currently married Marines with children	4.1	4.1	4.5	5.0	5.4	5.7	5.7	6.0
Single	1.6	1.5	1.7	2.1	2.5	2.7	2.6	2.5
Other	2.5	2.6	2.8	2.9	2.9	3.0	3.1	3.5

1. The FY 1988 and FY 1989 enlisted end-strength was approximately 2,000 Marines smaller than the end-strength of FY 1987.

Table 1. (Continued)

	1983	1984	1985	1986	1987	1988	1989	1990
Number of children per:								
Enlisted Marine	0.46	0.49	0.51	0.52	0.53	0.53	0.54	0.55
Currently married Marine	1.13	1.15	1.16	1.15	1.15	1.14	1.13	1.14
Currently married Marine with children	1.93	1.92	1.90	1.89	1.87	1.83	1.82	1.83
Number of children per:								
Not currently married Marine with children	1.55	1.51	1.50	1.47	1.46	1.43	1.42	1.44
Single	1.27	1.18	1.17	1.16	1.18	1.17	1.16	1.15
Other	1.72	1.69	1.69	1.69	1.69	1.66	1.64	1.63

As a result of rising marriage and dependency rates, the number of married Marines has mostly been increasing over the years. The same can be said of the number of married Marines with children. At the same time, the number of children per married Marine has remained largely unchanged, while the number of children per married Marine with children (in table 1) has been falling. The incidence of getting married, and of having children once married, is growing faster than the decline in the incidence of having additional children. One of the implications of this finding for the future is that the growing incidence of getting married is likely to result in more children.

The data in table 1 reveal the following facts about Marines who are not currently married.<sup>1</sup>

- Their number falls steadily over the years as a result of fairly constant end-strength and the rising number of currently married Marines.

1. These include never married, divorced, and widowed Marines.

- At the same time, the number of not currently married Marines who have children has been rising (there are now about 1,900 more such cases than there were in 1983).
- The average number of children belonging to not currently married Marines with children (mentioned in the preceding bullet) has been mostly falling.

These facts indicate that although there is increased incidence of single-parenthood in the Marine Corps, there are, on average, fewer children per single-parent household. Besides, many of the single parenthood cases are likely to be male Marines who are divorced but claim their children as dependents.<sup>1</sup>

Although the incidence of single parenthood is smaller in the Marine Corps than in the civilian population,<sup>2</sup> the trend in both sectors is similar. For example, table 1 shows that the biggest source of the growth in the number of not currently married Marines with children is single, never-married Marines; their numbers grew 46 percent from 1983 to 1990 (from 4,100 to 6,000). The same phenomenon about out-of-wedlock child bearing is chronicled by researchers in the civilian sector.<sup>3</sup>

#### The Trend Within Specific Grade and Age Groupings

The overall trends in marriage and dependency rates within paygrade depend upon the grade. The rates for grades E-1 and E-2 have been fluctuating up and down with increases only in the last three years.<sup>4</sup> Rates for senior enlisted personnel (grades E-6 through E-9) have been high and relatively stable at over 80 percent. The strong increases in marriage and dependency rates for grades E-3 through E-5 were enough to drive overall increases in marriage and dependency rates.

---

1. It was not possible to discern which of the spouses had custody of the children of single, divorced, or separated Marines. However, starting from FY 1991, a new field will be added to the HMF tapes that indicates whether or not the Marine has custody.

2. About 11 percent of Marine families with children under 18 (i.e., married Marines with children plus not currently married Marines with children) are single-parent families, while 23 percent of civilian family households with children under 18 are single-parent households. Civilian data are obtained from Bureau of the Census, *Household and Family Characteristics*, March 1988, Series P-20 No 437, table 1.

3. For details, see [3, 4].

4. Marriage rates for E1s fluctuated between 7 and 8 percent, while their dependency rates averaged 7.5 percent; marriage and dependency rates for E2s also fluctuated between 11 and 12 percent and between 12 and 13 percent, respectively.

The same general pattern is observed within specific age groupings. Marriage and dependency rates for male enlisted Marines under 20 years old have remained relatively unchanged since 1983 as have the rates for male enlisted Marines between 30 and 34, 35 and 39, and 40 years or older. The overall increase in marriage and dependency rates for enlisted males was primarily due to the increases in the rates for Marines between the ages of 20 and 29 years.<sup>1</sup>

#### Comparisons With the Other Services

The age and grade structure of the Marine Corps is different from the age and grade structure of the other services; the Marine Corps is younger, on average, and its grade structure more junior than the other services. These considerations precluded overall marriage rate comparisons for the Armed Forces.<sup>2</sup> Instead, the marriage rates of enlisted Marines aged 20 to 24 and 25 to 29 years (who make up the bulk of the enlisted force) will be compared to the rates of the enlisted ranks of comparable age groups in the other services.

Figure 2 shows that enlisted male Marines are generally less likely to be married than similarly aged enlisted members of the other armed services except the Navy.

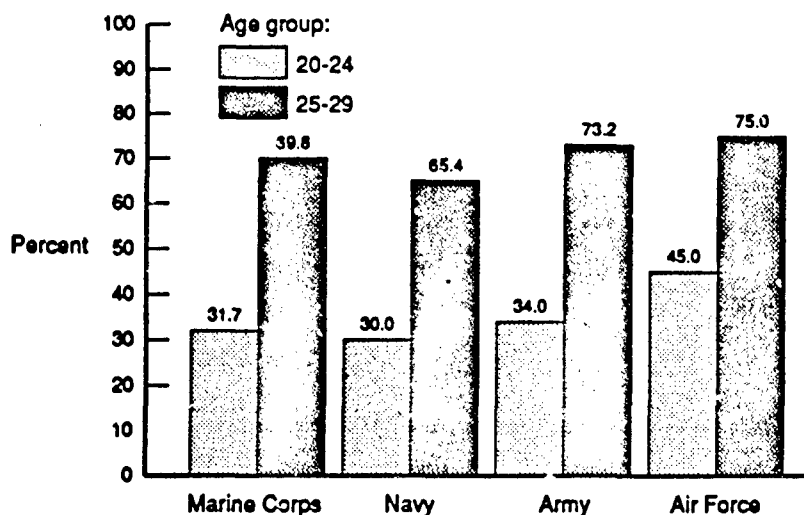
#### Comparisons With the Civilian Population

The growth in marriage and dependency rates for the 20- to 29-year age cohort reported above corresponds roughly to grades E-3 through E-5, mentioned earlier. A question immediately arises: Is the incidence of marriage in the Marine Corps comparable to the incidence in the civilian population?

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1. Marriage rates for 20- to 24-year-old males grew from 29 percent in 1983 to about 31 percent in 1990, while their dependency rate increased from 31 percent to about 34 percent in the same period. Male 25-29 year-olds show an increase in marriage and dependency rates from 68 and 72 percent in 1983 to 70 and 75 percent in 1990, respectively.

2. Overall marriage rate comparisons reveal that enlisted Marines are less likely to be married, since the Marine Corps is younger and more junior in grade than the other services. The Defense Manpower Data Center (DMDC) provided the data on marriage rates of active-duty enlisted members of the Navy, Army, and the Air Force.



NOTE: Navy, Army, and Air Force data were obtained from Defense Manpower Data Center (DMDC).

Figure 2. Percentage married, by service and age group: enlisted males, FY 1990

Table 2 provides some insights with 1989 data.<sup>1</sup> First, in all age groups, male enlisted Marines are substantially more likely to be married than civilians of the same age as can be seen from table 2 and figure 3<sup>2</sup> (see also figures 4 and 5). Marriage rates for all male Marine age groups (except those under 20 years) are at least 10 percentage points higher than the rates for civilian males of the same age; for 30- to 34-year-olds, Marines' marriage rate is up to 21 percentage points higher than the rate for civilians.

1. 1989 is the most recent year for published U.S. Census data.

2. Figure 3 translates the marriage percentages of enlisted male Marines between the ages of 20 through 39 years old (the first two rows of table 2) into a graph.

**Table 2. Comparisons of marriage/dependency statuses for male civilians and male enlisted Marines, 1989**

	Age				
	Under 20	20-24	25-29	30-34	35-39
<b>Percentage married</b>					
Marine Corps	6.5	31.7	69.8	83.7	87.5
Civilian population	2.5	20.1	46.8	62.5	70.5
<b>Percentage of married couples with children of any age<sup>a</sup></b>					
Marines	22.8	39.8	68.8	85.1	91.5
Civilians	48.0	50.7	65.6	80.1	86.6
<b>Percentage of married couples with pre-school-age children<sup>a</sup></b>					
Marines	22.7	38.2	59.7	50.9	27.8
Civilians	45.9	48.8	57.1	59.2	41.4
<b>Percent of married couples with school-age children<sup>a</sup></b>					
Marines	0.2	4.1	24.9	64.8	82.8
Civilians	1.0	4.9	23.4	48.7	70.1
<b>Number of children under 18 per married couple</b>					
Marines	0.34	0.51	1.15	1.79	2.04
Civilians	0.59	0.70	1.09	1.58	1.83

Table 2. (Continued)

	Age				
	Under 20	20-24	25-29	30-34	35-39
Number of children under 18 per married couple with children					
Marines	1.20	1.34	1.77	2.20	2.34
Civilians	b	1.38	1.67	1.98	2.14

NOTE: Civilian population data were obtained from the Bureau of the Census, *Current Population Reports*, series P-20 Nos. 445 and 447, March 1989.

- a. Proportion of the total number of married persons in each age group that have children of the specified ages.  
b. Civilian data not available.

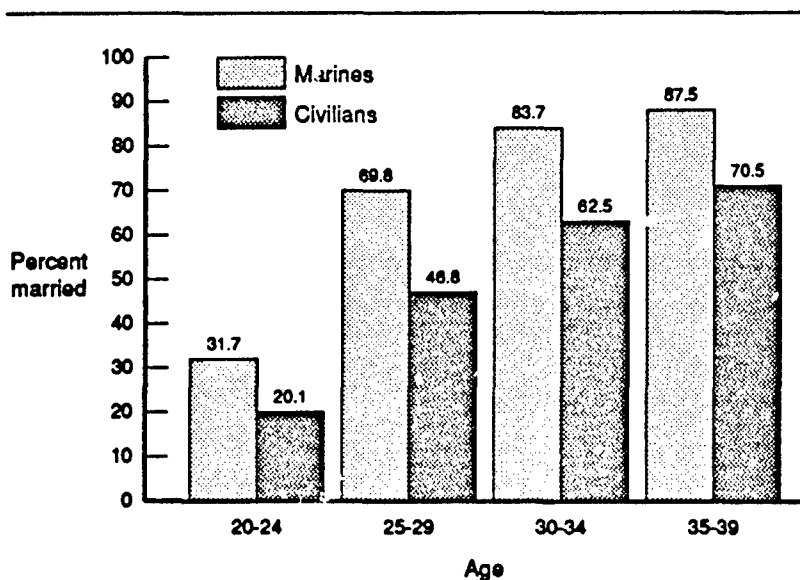
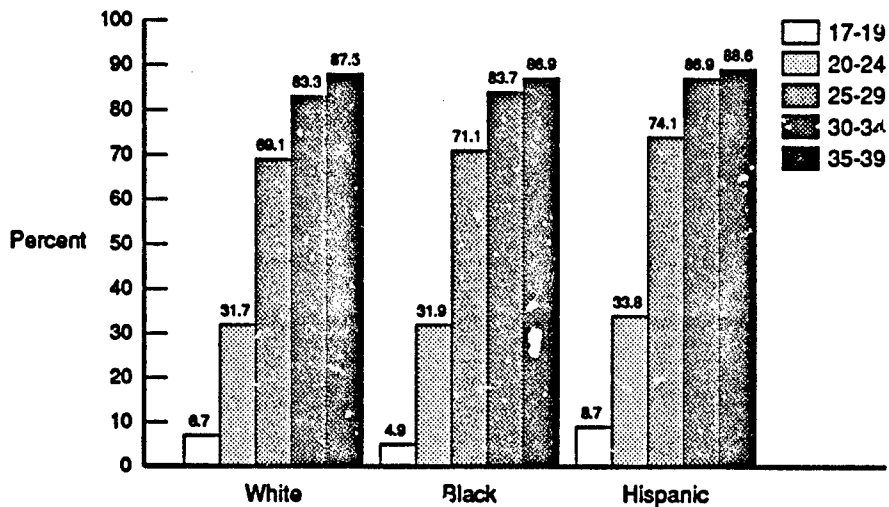


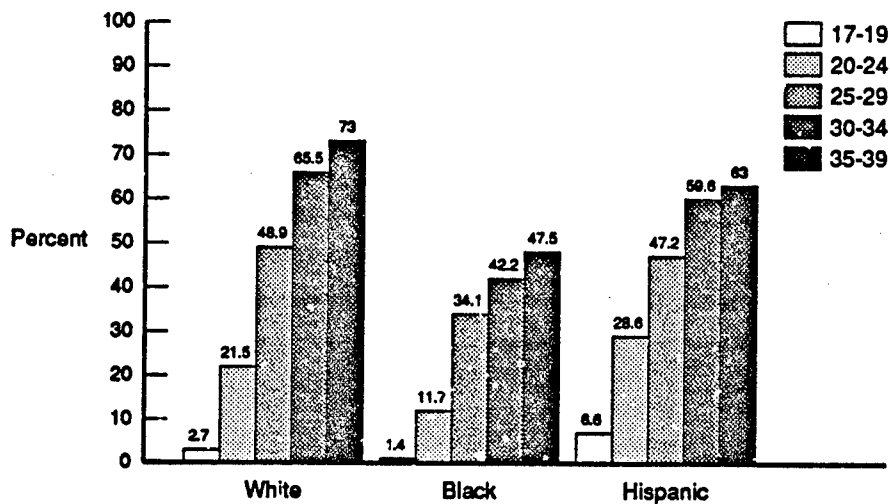
Figure 3. Percentage married, by age group: enlisted male Marines and civilians, FY 1989



Marine Corps, 1989 enlisted males



Male civilian population



NOTE: Persons of Hispanic origin may be of any race.

The percentage married of enlisted male Marines in the "other" racial/ethnic category are: Ages 17-19, 4.1%; 20-24, 25.9%; 25-29, 64.5%; 30-34, 85.1%; 35-39, 90.4%.

Figure 4. Percentage married, by race: enlisted male Marines and civilians, 1989

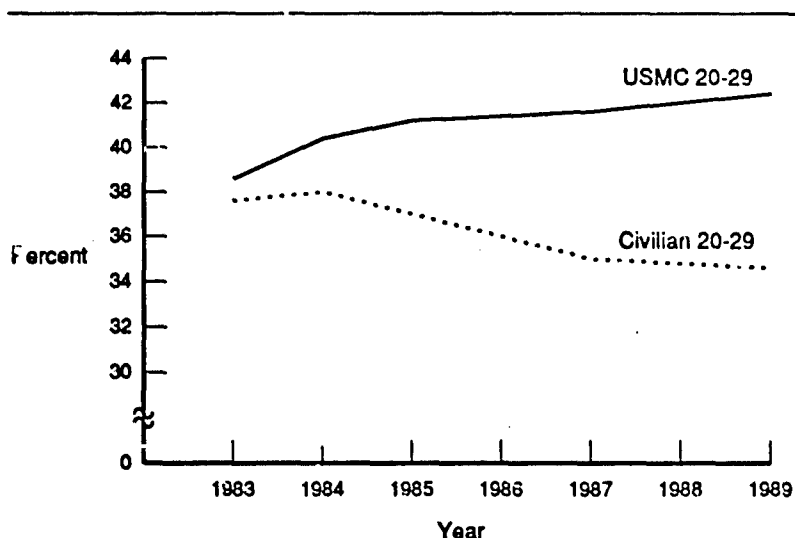


Figure 5. Percentage married, by age group: enlisted male Marines and civilians, 1983-1989

However, once married, young civilians (ages 24 and under) are more likely to have pre-school-age and school-age children than are young married Marines. Young married civilians also have more children per family than young married enlisted Marines. There still are, however, proportionally fewer 20- to 24-year-old male married civilians with children than married male enlisted Marines with children because so many more Marines are married.

Second, married Marines who are 25 years or older are more likely to have children than their civilian counterparts. They also have more children on average than the civilians. Last, of those individuals who are married and have children, Marines have a higher average number of children than civilians of the same age (except for those between the ages of 20 and 24 years).

1. Note from table 2 that 32 percent of 20- to 24-year-old male Marines are married and 40 percent of those married have children of any age. Thus, the proportion of all 20- to 24-year-old male Marines that are married with children is 12.8 percent ( $0.40 \times 0.32$ ). A similar calculation for civilian males shows that only 9.7 percent of 20- to 24-year-olds are married with children. Again, these numbers are for 1989, the most recent year of published civilian data.

Figure 4 provides additional insights (using 1989 data) into the differing marriage rates between Marines and civilians, but now along racial/ethnic lines. Black male Marines between the ages of 20 and 34 years are slightly more likely to be married than white male Marines of the same age. However, the very young (under 20) as well as the oldest group of black male Marines (35-39) are less likely to be married than white male Marines of similar ages. All Hispanic age groups are more likely to be married than their white or black counterparts in the Marine Corps.<sup>1</sup> These differences in marriage rates between age groups across races indicate that race may be treated differently for analytical purposes, as will be seen later.

Marriage rates by race (and within age groups) in the civilian population are quite different from those in the Marine Corps; white civilian males of all age groups are more likely to be married than black civilian males and are more likely to be married than Hispanic males in most age groups. Furthermore, note (from figure 4) that marriage rates are higher for Marines than for civilians across all age groups and across all races. Thus, the higher marriage levels for Marines than for civilians reported in table 2 hold across racial/ethnic lines as well.

The sharpest difference between rates for male Marines versus civilians is for blacks; within comparable age groups, blacks are, on average, about twice as likely to be married in the Marine Corps than in the civilian population. This may mean that black families self-select into the Marine Corps and into the military in general. The reasons may be economic; careers in the military are more stable than in the civilian sector, particularly for blacks. One may expect these same economic forces to work on other race/ethnic groups albeit at varying degrees.

In short, table 2 and figures 3 and 4 show that Marines of most ages are more likely to be married, and once married, older Marines (25 years and older) are more likely to have children than are civilians of similar ages. The data for the comparisons are the most recent for which civilian tabulations are available, namely 1989. Can we expect these findings to hold for future years? Projecting into the future is risky, but some insight can be obtained by looking at patterns between 1983 and 1989.

Figure 5 depicts the marriage rate of Marines and civilians of 20 to 29 years since 1983. Notice that Marine marriage rates are higher than the civilian rates in all the years, not just in 1989. More important, the marriage rates diverge in the recent years; while marriage rates among civilians have been falling, the rate among Marines has been rising. Additionally, earlier discussion showed that the dependency rate for Marines is on an upward trend with the trend being

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1. Persons of Hispanic origin may be of any race.

driven by the dependency rate of Marines in their twenties. Therefore, it is likely that the comparisons of table 2 will hold in a more recent year than 1989.

The civilian data are derived from a random and representative sample of the United States population and encompasses individuals with a variety of educational and socioeconomic backgrounds, including college bound, affluent, white collar, employed, as well as non-college bound, poor, blue collar, and unemployed individuals.

The Marine Corps enlisted force, on the other hand, can be characterized as generally comprising non-college bound, employed individuals with stable earnings. This difference in some of the characteristics of enlisted Marines and civilians may raise an issue about the comparability of the two samples (Marines versus civilians). While the difference in characteristics in the two populations may lead to differences in marriage or dependency behavior, the divergence in the 1980s in marriage rates in the two populations cannot be explained by differences in the composition of the population.

Since the late 1950s, there has been a downward trend in family formation and family size in the population at large as people get married at older ages and have fewer children.<sup>1</sup> This reflects a fundamental shift in behavior in U.S. society. Indeed, the status of family formation in the civilian population, particularly in the last two decades, can be characterized as follows:

- Delayed first-time marriages. See [3].
- Higher divorce rates. The delaying of marriages among young people, coupled with a rising number of divorced people have led to a divorce rate of 142 divorced people for every 1,000 married people; this represents a tripling of the divorce rate over the last two decades [5].
- Increasing proportion of adult children living with their parents. The percentage of all men between the ages of 25 and 34 years living with their parents rose from 9.5 percent in 1970 to 15 percent in 1990. For women, the

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1. Data obtained from the Bureau of the Census, *Current Population Reports*, show that the median age at first marriage jumped from 20.1 and 22.5 years in 1950 to 23.6 and 26.0 years in 1989 for men and women, respectively. The number of children per family fell from about 1.5 in 1965 to about 1.0 in 1989. Also, marriage rates, measured in the number of marriages per 100 unmarried women, has been declining since the late 1950s, and by 1987, it reached 5.6 marriages per 100 unmarried women, matching the all-time low rate of the economic depression of the 1930s. For further details, see [3].

increase was from 6.6 percent in 1970 to 8.1 percent in 1990. Furthermore, nearly one in three single men and one in five single women between the ages of 25 and 34 years were living with their parents last year [6].

The divergence in the trend in family formation between the Marine Corps (and quite likely, the military in general) and the civilian population coincides with the military pay raises of the early eighties. The Marine Corps has become older during the 1980s as retention rates increased after the pay raises of 1981 and 1982. A shift in force structure toward older ages is expected to increase marriage rates, because older individuals are more likely to be married than younger ones. Furthermore, higher income of military personnel makes it more affordable for Marines to start a family and therefore contributes to higher marriage and dependency rates within specific age groups. Earlier CNA research found marriage and dependency rates among Marines to be related to an index of military pay and allowances from the late seventies to the mid-eighties [1, 2].

#### SHIFT-SHARE ANALYSIS OF MARRIAGE AND DEPENDENCY RATES<sup>1</sup>

Shift-share analysis is a technique that breaks down (or decomposes) general changes (or trends) in data into component parts. In manpower issues, the components are typically those of (1) changes in the mix of observable characteristics, such as gender, race, age, education, Armed Forces Qualifying Test (AFQT) score categories, and (2) changes in the behavior of the individuals with the specified characteristics.

Here, the analysis is concerned with how changes in the racial/ethnic, age, and grade structure of the enlisted force can account for rising dependency rates. The four racial/ethnic categories frequently used by the Marine Corps are used here: white, black, Hispanic, and other.<sup>2</sup> Age is measured in single years from 17 through 39 within each enlisted grade.<sup>3</sup>

The effect of changes in behavior (with regard to marriage and having dependents) within each race, age, and grade combination is also investigated. This latter aspect of the decomposition will shed light

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1. A shift-share analysis of marriage and dependency rates for females is presented in appendix A. The technical derivations of shift-share analysis are presented in appendix B.

2. "Other" races include American Indian/Alaskan native, and Asian/Pacific Islander. The differences in marriage and dependency rates along racial/ethnic lines were thought to be enough to categorize by race.

3. Marines 40 years and older were grouped into one age cell. Grades E-7 through E-9 are combined into a single unit, since their dependency rates are similar and stable.

on the issue of whether or not the average Marine is more (or less) likely to be married or have dependents now as he/she did years ago, and if so, how much has this contributed to the observed marriage and dependency rates.

#### **Baseline Rates**

Fiscal 1983 was chosen to identify baseline marriage and dependency rates because that was the earliest year of available data that contain the complete set of Marines' background characteristics. The FY 1983 rates of each racial/ethnic, age, and grade cell are used to establish marriage and dependency propensity from which predicted or "expected" rates are derived.

#### **Predicted Rates**

The predicted rate is simply the rate that reflects only the changes in the mix of characteristics; it essentially reflects what one expects the overall marriage and dependency rate to be, given the current mix of characteristics and baseline marriage and dependency rates of FY 1983.

#### **Decomposition into Changes in Characteristics and Changes in Behavior**

The total change from year to year is the difference in the actual rates. For example, in table 3, the actual marriage rate for FY 1983 is 38.0 percent and for FY 1984 it is 39.6 percent, yielding a total increase of 1.6 percent.

The difference between the predicted rate for each year and the actual rate for FY 1983 is the expected change. That is to say, it is the increase (or decrease) in marriage/dependency rates, given the current shares of the mix of characteristics. For example, the predicted marriage rate for FY 1984 in table 3 is 38.2; the expected increase in marriage rates was 0.2 percent. This is not surprising given that the average age of most grades was higher in FY 1984 than in FY 1983 and that older Marines are more likely to be married than younger ones.<sup>1</sup>

Finally, the difference between the actual rate and the predicted rate for each year is the unexpected change. This is the part of the total change that is due to shifts in behavior. For FY 1984, 1.4 of 1.6 percent total change in marriage rates from FY 1983 (88 percent of the change) is due to shifts in behavior.

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1. The average ages in 1984 of grades E-3 through E-7/E-9 were respectively, 0.2, 0.2, 0.5, 0.4, and 0.1 years higher than the ages of those grades in 1983. The differences in average age per grade are even greater in the later years.

Note from tables 3 and 4 that the total change in marriage and dependency rates gets progressively larger over time, underlying the upward trend reported earlier. A sizable portion (about half, at least) of this trend over the years can be attributed to changes or shifts in behavior (see figures 6 and 7). The other half of the total change is attributed mainly to an older force.

Table 3. Marriage rates: composition of changes since 1983, males

Year	Actual rate	Predicted rate <sup>a</sup>	Total change since 1983	Expected change <sup>a</sup>	Unexpected change <sup>b</sup>	Percent of total change since 1983 due to shifts in behavior
1983	38.0	n/a	n/a	n/a	n/a	n/a
1984	39.6	38.2	1.6	0.2	1.4	88.0
1985	41.0	39.0	3.0	1.0	2.0	67.0
1986	41.7	39.9	3.7	1.9	1.8	49.0
1987	42.5	40.3	4.5	2.3	2.2	49.0
1988	42.9	40.5	4.9	2.5	2.4	49.0
1989	43.7	40.8	5.7	2.8	2.9	51.0
1990	44.1	41.1	6.1	3.1	3.0	49.0

a. Due to changes in the mix of characteristics.

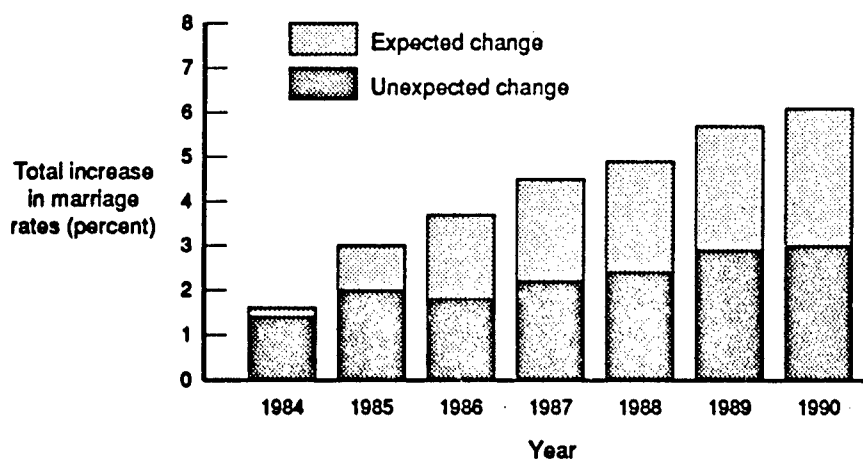
b. Due to changes in behavior.

Table 4. Dependency rates: composition of changes since 1983, males

Year	Actual rate	Predicted rate <sup>a</sup>	Total change since 1983	Expected change <sup>a</sup>	Unexpected change <sup>b</sup>	Percent of total change since 1983 due to shifts in behavior
1983	40.5	n/a	n/a	n/a	n/a	n/a
1984	42.0	40.8	1.5	0.3	1.2	80.0
1985	43.8	41.6	3.3	1.1	2.2	67.0
1986	45.0	42.6	4.5	2.1	2.4	53.0
1987	45.8	43.1	5.3	2.6	2.7	51.0
1988	46.4	43.2	5.9	2.7	3.2	54.0
1989	46.7	43.6	6.2	3.1	3.1	50.0
1990	47.4	43.9	6.9	3.4	3.5	51.0

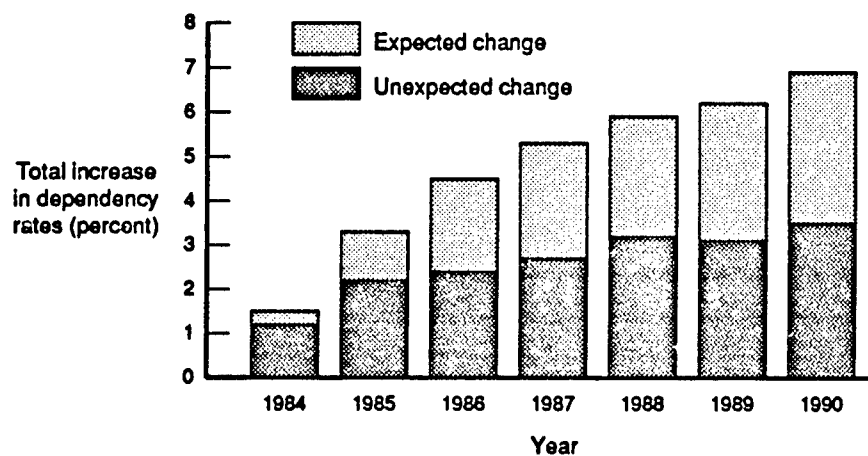
a. Due to changes in the mix of characteristics.

b. Due to changes in behavior.



NOTES: Expected change = portion accounted for by changes in the mix of characteristics.  
Unexpected change = portion accounted for by shifts in behavior.

Figure 6. Composition of total increase in marriage rates over 1983, males



NOTES: Expected change = portion accounted for by changes in the mix of characteristics.  
Unexpected change = portion accounted for by shifts in behavior.

Figure 7. Composition of total increase in dependency rates over 1983, males



## THE TIMING OF MARRIAGES IN THE MARINE CORPS

It has been shown that Marine Corps marriage and dependency rates are currently on an upward trend. But it is also important to know when Marines get married. Such knowledge will shed further light on the issue and perhaps enhance policy making on the matter.

In order to determine the timing of marriages, non-prior-service (NPS) male and female enlisted Marines who enlisted in FY 1984 were tracked for six years.<sup>1</sup> Briefly, the characteristics of this accession sample were the following:

- About 74 percent were white, 19 percent were black, 4 percent were Hispanic, and 3 percent were classified as "other."
- Males comprised 94 percent and females 6 percent.
- Three percent signed three-year contracts, 83 percent were four-year obligors, and 14 percent were on five- or six-year contracts.

In short, the FY 1984 accession was a representative sample.

One thing that is clear is that recruits do not come in married. As table 5 shows, less than 5 percent of the accession sample were married when they came into the service. Thus, if the Marine Corps were to restrict accession to single recruits, such a policy would have little impact on the overall Marine Corps marriage and dependency rates. Furthermore, previous research has shown that marital status upon entry has no effect on first-term attrition [8]. The same study found that married accessions are (a) more likely to complete their first term and be promoted to corporal (by the end of the first term) and (b) more likely to be retained beyond the first term [8]. Also, a Marine Corps retention study finds that married Marines (regardless of whether or not they come in married) are more likely to be retained [9].

Table 5 also shows that the percentage married increases with years of service: by the fourth year of service, one-third of the FY 1984 cohort were married, and by the sixth year of service (September 1990),<sup>2</sup>

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1. By September 1984, some of the enlistees would already have had almost one year of service, while others (who just accessed) would have had only a few days time-in-service. Marines who leave are dropped from the calculations at the time they leave.

2. Many of the three- and four-year obligors would have reenlisted at this point. Also, about half of the entire sample had left the Marine Corps by September 1990.

44 percent were married, a comparable level for the entire enlisted force. Thus, while new enlistees are mostly unmarried, many get married (and/or have children) at some point in their careers with the Marine Corps.

Table 5. Marital status of enlisted NPS Marines, by year of service: 1984 accession cohort

	Time	Year of service	Percent married	Percent single <sup>a</sup>
At accession			4.3	95.3
September	1985	1	7.8	91.8
	1986	2	15.9	83.5
	1987	3	24.9	74.3
	1988	4	33.2	65.5
	1989	5	40.2	58.1
	1990	6	44.1	53.4

a. Single refers to never-married Marines. The sum of percent married and percent single may not add up to 100, since some Marines' marital status was classified as "other," that is, separated, divorced, widowed, etc.

## SUMMARY AND DISCUSSION

The Marine Corps is currently experiencing an upward trend in marriage and dependency rates. While 38.0 percent of enlisted male Marines were married in 1983, by 1990 this percentage had grown to 44.1. Also, the percentage of male Marines with dependents (including spouse) increased from 40.5 to 47.4 percent in the same period. There was a similar trend for female enlisted Marines. Most of the increase in marriage and dependency rates among enlisted Marines is driven by higher rates for grades E3 through E5.

Male Marines are currently more likely to be married than civilian males of similar ages. Also, married male Marines in their prime child-bearing years (25 and up) are currently more likely to have children than civilians of comparable age. The falling average number of children per married Marine probably indicates a movement toward a smaller family size already observed in the civilian population. But

1. The word "prime" does not refer to a biological state. Instead, it refers to the point in their careers when most people begin to afford children.

Marines 25 years and older still have more children per couple than civilians. This fact and the rising marriage rates probably indicate more children in Marine Corps families in the intermediate term. Also, the trend in family formation among Marines is different from general trends in the civilian population in the 1980s; unlike civilian males of comparable ages, enlisted Marines were more likely to be married at the end than at the beginning of the 1980s. It is very likely that the military pay raises of the early eighties contributed to the rising marriage and dependency rates among Marines.

Higher relative military pay meant higher retention rates of recommended and eligible Marines with the result that the enlisted force has become more senior in age and in grade. Indeed, the age and grade shift was identified above as a source of the increase in marriage and dependency rates among Marines (see figures 6 and 7). Additionally, higher pay meant that more Marines (on average) could afford a family, which may explain the rise in marriage and dependency rates within specific age groups. About half of the increase in marriage and dependency rates since FY 1983 is attributed to the increase in marriage propensity within specific age groups.

The preceding point is supported by earlier CNA research (although in a different analytical framework) that found the increase in marriage and dependency rates in the Marine Corps to be related to the higher total military pay index in the decade of the eighties relative to the seventies.<sup>1</sup>

Being married has no effect on first-term attrition; on the contrary, it is positively associated with retention. But higher marriage and dependency rates have impacts on the costs of force management and perhaps readiness. Therefore, understanding family formation in the Marine Corps is essential for planning future budget requirements.

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1. This finding is probably bolstered by figure 2, above, which shows even higher marriage rates for the other services. Thus, there appears to be a military-wide divergence from civilian patterns.

#### REFERENCES

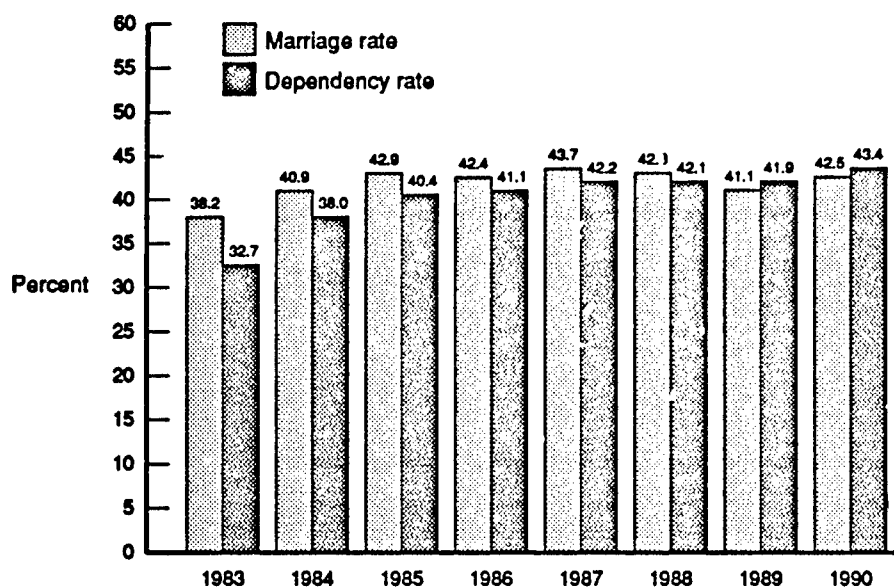
- [1] CNA Research Memorandum 85-25, *Determinants of Dependency Rates for Marine Corps Enlisted Personnel*, by Peter F. Kostiuik, May 1985
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- [9] CNA Research Memorandum 91-64, *Reenlisting in the Marine Corps: The Impact of Bonuses, Grade, and Dependency Status*, by Aline O. Quester, Adebayo M. Adediji, forthcoming

**APPENDIX A:**

**SHIFT-SHARE ANALYSIS OF MARRIAGE AND DEPENDENCY RATES  
FOR ENLISTED FEMALES**

**APPENDIX A**  
**SHIFT-SHARE ANALYSIS OF MARRIAGE AND DEPENDENCY RATES**  
**FOR ENLISTED FEMALES**

The upward trend in marriage and dependency rates so apparent for enlisted males is less strong for enlisted females. As figure A-1 shows, although marriage and dependency rates were higher in FY 1990 than they were in FY 1983, they peaked in FY 1987 and have fallen slightly since. Nevertheless, it is premature to say that marriage and dependency rates for female enlisted Marines are on a downward trend. A curious thing is that in almost all cases, marriage rates are higher (except in FY 1989 and 1990) than dependency rates for enlisted females. Ordinarily, one does not expect this to be so, since dependency rates can include spouses.<sup>1</sup>



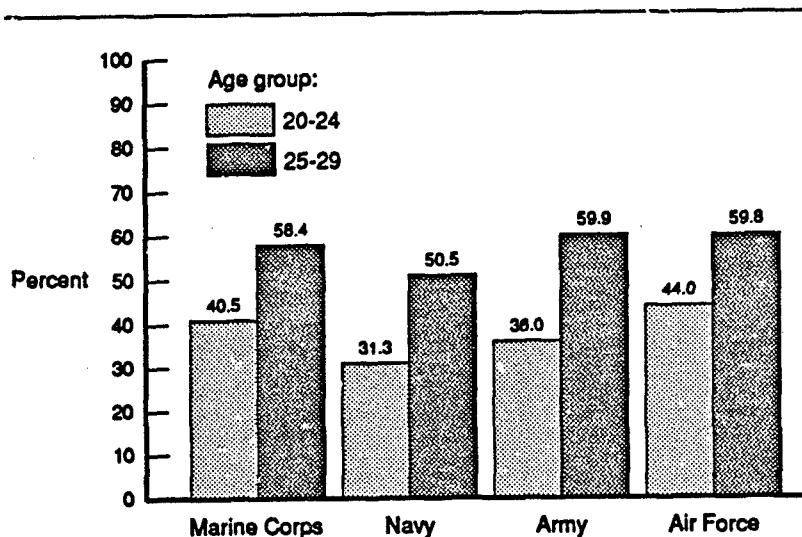
NOTE: Dependents include spouse and children under 18 years of age.

**Figure A-1.** Marriage and dependency rates for enlisted female Marines, September of year

1. In other words, marriage rates are a subset of dependency rates as the terms are defined here.

However, for female Marines, there are reasons for such an occurrence. The MARSTAT (marital status) field was used to obtain the marriage rate, while the dependency fields were used to obtain the dependency rate. But many female Marines do not claim their husbands as dependents in the NUMDEP field, particularly female Marines with military spouses. Fully two-thirds of married female Marines have military spouses. A frequency tabulation shows that the dependency rate for married female Marines is less than 100 percent, further supporting the argument made above.

Enlisted female Marines aged 20 to 24 years are more likely to be married than enlisted females of similar ages in the Navy and the Army, and are less likely to be married than similarly aged enlisted females in the Air Force (figure A-2).



NOTE: Navy, Army, and Air Force data were obtained from Defense Manpower Data Center (DMDC).

Figure A-2. Percentage married, by service and age group: enlisted females, FY 1990

Enlisted female Marines in the 25- to 29-year age group are less likely to be married than enlisted females of the other services except the Navy (see figure A-2). These findings are similar to the findings about the marriage behavior of enlisted male Marines when compared to enlisted males of the other services.

In a procedure identical to the one utilized in the shift-share analysis for males, race, age, and grade combinations were made for females. Each race, age, grade cell was then used to calculate weighted average baseline marriage and dependency rates for FY 1983. Weighted average rates were also calculated for each subsequent year until FY 1990.<sup>1</sup> Again, the weights are the relative size (to total female enlisted force) of each race, age, and grade cell.

Predicted rates for each subsequent year were obtained by using the marriage and dependency rates of FY 1983 in conjunction with the current year's share (or relative size) of each race, age, and grade combination. That is to say, the predicted rates reflect only the changes in the mix of characteristics, everything else, including behavior, remaining unchanged.

From table A-1, the total change in actual marriage rates from FY 1983 to FY 1984 was 2.7 percent (38.2 to 40.9). The expected change in marriage rates for the same year was 0.3 percent, the difference between the predicted rate and the actual rate for FY 1983. Finally, the unexpected change for FY 1984 was 2.4 percent, which is the difference between the FY 1984 actual rate and the FY 1984 predicted rate. This is the change that is attributed to shifts in behavior.

As can be seen from tables A-1 and A-2 and figures A-3 and A-4, substantially more than half of the total change in marriage and dependency rates in each year (FY 1983 to FY 1990) can be classified as unexpected change. Put differently, a significant portion of the current trend in marriage and dependency rates can be attributed to changes in behavior, not just changes in the mix of characteristics. A similar finding was reported in the analysis for males in the main text of this memorandum.

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1. These weighted marriage and dependency rates are referred to as the actual rates in tables A-1 and A-2, below.



Table A-1. Marriage rates: composition of changes since 1983, females

Year	Actual rate	Predicted rate <sup>a</sup>	Total change since 1983	Expected change <sup>a</sup>	Unexpected change <sup>b</sup>	Percent of total change since 1983 due to shifts in behavior
1983	38.2	n/a	n/a	n/a	n/a	n/a
1984	40.9	38.5	2.7	0.3	2.4	89.0
1985	42.9	39.4	4.7	1.2	3.5	74.0
1986	42.4	39.7	4.2	1.5	2.7	64.0
1987	43.7	40.3	5.5	2.1	3.4	62.0
1988	42.8	39.4	4.6	1.2	3.4	74.0
1989	41.1	38.4	2.9	0.2	2.7	93.0
1990	42.5	38.7	4.3	0.5	3.8	88.0

a. Due to changes in the mix of characteristics.

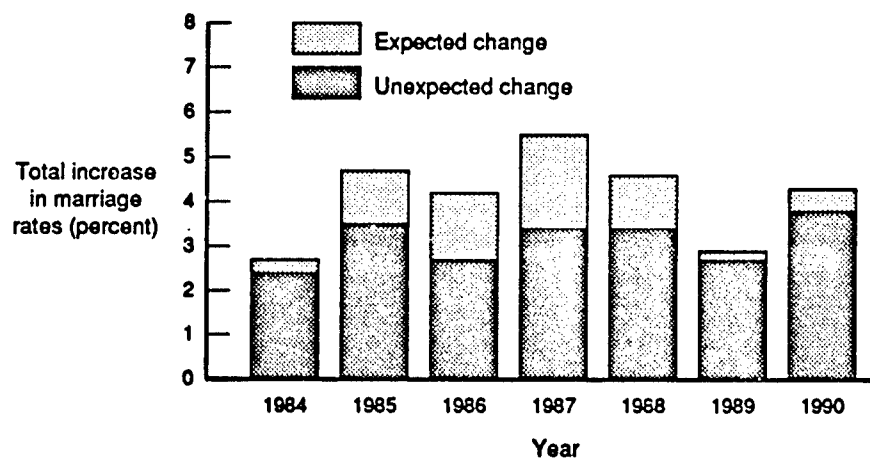
b. Due to changes in behavior.

Table A-2. Dependency rates: composition of changes since 1983, females

Year	Actual rate	Predicted rate <sup>a</sup>	Total change since 1983	Expected change <sup>a</sup>	Unexpected change <sup>b</sup>	Percent of total change since 1983 due to shifts in behavior
1983	32.7	n/a	n/a	n/a	n/a	n/a
1984	38.0	33.4	5.3	0.7	4.6	87.0
1985	40.4	34.3	7.7	1.6	6.1	79.0
1986	41.1	34.6	8.4	1.9	6.5	77.0
1987	42.2	35.4	9.5	2.7	6.8	72.0
1988	42.1	34.9	9.4	2.2	7.2	77.0
1989	41.9	34.3	9.2	1.6	7.6	83.0
1990	43.4	34.8	10.7	2.1	8.6	80.0

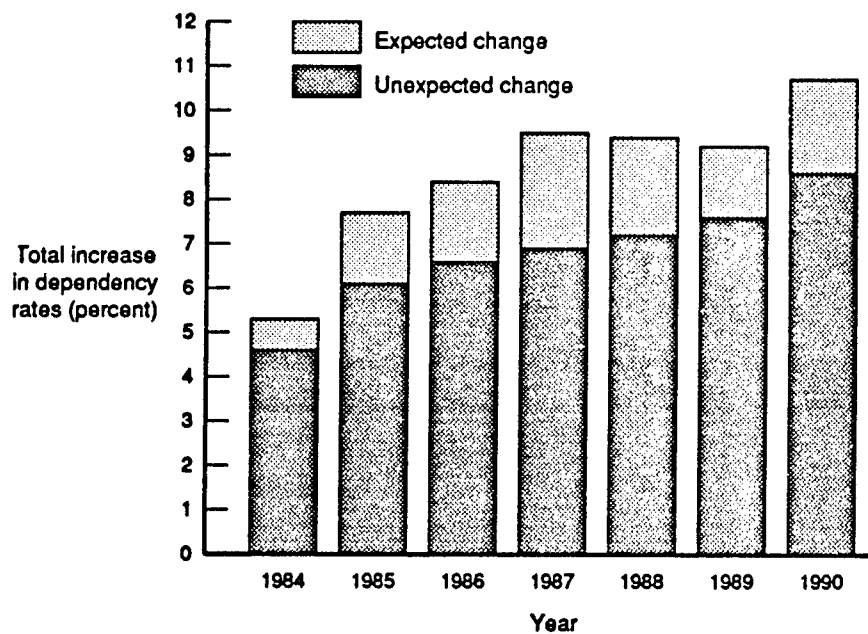
a. Due to changes in the mix of characteristics.

b. Due to changes in behavior.



NOTES: Expected change = portion accounted for by changes in the mix of characteristics.  
Unexpected change = portion accounted for by shifts in behavior.

Figure A-3. Composition of total increase in marriage rates over 1983, females



NOTES: Expected change = portion accounted for by changes in the mix of characteristics.  
Unexpected change = portion accounted for by shifts in behavior.

Figure A-4. Composition of changes in dependency rates since 1983, females

**APPENDIX B:**

**SHIFT-SHARE ANALYSIS: A TECHNICAL NOTE**

APPENDIX B  
SHIFT-SHARE ANALYSIS: A TECHNICAL NOTE

Shift-share analysis is a technique that breaks down (or decomposes) changes in data into component parts. The technique is employed in this research memorandum to break down changes in marriage and dependency rates from FY 1983 to FY 1990 into the part that is due to changes in the mix of characteristics and the part that is due to changes in behavior. FY 1983 was chosen as the starting year because that was the earliest year data were available. The mix of characteristics focused on are racial/ethnic background, age, and grade, because marriage and dependency rates are known to vary substantially along those lines.

Let the marriage or dependency rate for FY 1990,  $M_{90}$ , be a weighted average with the weights being the relative (to enlisted end-strength) size or "share" of each racial/ethnic, age, and grade cell; that is,

$$M_{90} = \sum_{i=1}^n s_{i90} d_{i90} ,$$

where  $i$  is an index for each racial/ethnic, age, and grade cell,  $n$  is the maximum number of racial/ethnic, age, and grade combinations possible (in this case, 1,130 combinations),  $s_{i90}$  is the relative (to enlisted end-strength) size of each racial/ethnic, age, and grade cell, and  $m_{i90}$  is the marriage or dependency rate for each racial/ethnic, age, and grade cell.

Similarly, the weighted average of marriage/dependency rates for FY 1983 can be expressed as:

$$M_{83} = \sum_{i=1}^n s_{i83} m_{i83} .$$

The change in marriage/dependency rates from FY 1983 to FY 1990 can be expressed as follows:

$$\begin{aligned} M_{90} - M_{83} &= \sum_{i=1}^n s_{i90} m_{i90} - \sum_{i=1}^n s_{i83} m_{i83} \\ &= \sum_{i=1}^n m_{i83} (s_{i90} - s_{i83}) + \sum_{i=1}^n s_{i83} (m_{i90} - m_{i83}) \\ &\quad + \sum_{i=1}^n (s_{i90} - s_{i83}) (m_{i90} - m_{i83}) . \end{aligned}$$

The first term of the last expression represents the part of the change in marriage/dependency rates that is due to changes in the mix of characteristics ( $s_{190} - s_{183}$ ), given that the rate for each race/ethnic, age, and grade cell ( $m_{183}$ ) remains unchanged. This term was referred to as the predicted or "expected" rate in the text. The next two terms of the above equation represent the part of the total change in marriage/dependency rates that is due to changes in behavior (or changes in rates of each cell,  $m_{190} - m_{183}$ ). Their sum was referred to as the "unexpected" change in marriage/dependency rates in the text.

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